

WE CLAIM:

1. A plant cell comprising a nucleic acid molecule wherein said nucleic acid molecule comprises:
  - a) one or more target binding domains wherein that target binding of the nucleic acid molecule to a target pre-mRNA expressed within a cell;
  - b) a 3' splice region comprising a 3' splice acceptor site;
  - c) a spacer region that separates the 3' splice region from the target binding domain; and
  - d) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA; wherein said nucleic acid molecule is recognized by nuclear splicing components within the cell.
  
2. A plant cell comprising a nucleic acid molecule wherein said nucleic acid molecule comprises:
  - a) one or more target binding domains that target binding domain of the nucleic acid molecule to a target pre-mRNA expressed within a plant cell;
  - b) a 5' splice site;
  - c) a spacer region that separates the 5' splice site from the target binding domain; and



- d) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA;

wherein said nucleic acid molecule is recognized by nuclear splicing components within the cell.

3. The plant cell of claim 1 wherein the nucleic acid molecule further comprises a 5' donor site.
4. The plant cell of claim 1 wherein the nucleic acid molecule further comprises a UA rich sequence.
5. The plant cell of Claim 1 wherein the nucleic acid molecule further comprises a safety nucleotide sequence comprising one or more complementary sequences that bind at or adjacent to one or more sides of the 3' splice region.
6. The plant cell of Claim 2 wherein the nucleic acid molecule further comprises a safety sequence comprising one or more complementary sequences that bind at or adjacent to one or more sides of the 5' splice region.



7. The plant cell of Claim 1 wherein the nucleic acid molecule further comprises sequences encoding a translatable protein product.
8. The plant cell of Claim 1 wherein the nucleic acid molecule further comprises a nucleotide sequence containing a translational stop codon.
9. A plant cell comprising a recombinant vector wherein said vector expresses a nucleic acid molecule comprising:
  - a) one or more target binding domains that target binding domain of the nucleic acid molecule to a target pre-mRNA expressed within a plant cell;
  - b) a 3' splice region comprising a 3' splice acceptor site;
  - c) a spacer region that separates the 3' splice region from the target binding domain; and
  - d) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA; wherein said nucleic acid molecule is recognized by nuclear splicing components within the cell.
10. A cell comprising a recombinant vector wherein said vector expresses a nucleic acid molecule comprising:



- a) one or more target binding domains that target binding domain of the nucleic acid molecule to a target pre-mRNA expressed within a plant cell;
- b) a 5' splice site;
- c) a spacer region that separates the 5' splice site from the target binding domain; and
- d) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA; wherein said nucleic acid molecule is recognized by nuclear splicing components within the cell.

- 11. The cell of claim 9 wherein the nucleic acid molecule further comprises a 5' donor site.
- 12. The cell of claim 9 wherein the nucleic acid molecule further comprises a UA rich sequence.
- 13. A method of producing a chimeric RNA molecule in a plant cell comprising:  
  
contacting a target pre-mRNA expressed in the cell with a nucleic acid molecule recognized by nuclear splicing components wherein said nucleic acid molecule comprises:



- a) one or more target binding domains that target binding domain of the nucleic acid molecule to a target pre-mRNA expressed within a plant cell;
- b) a 3' splice region comprising a 3' splice acceptor site;
- c) a spacer region that separates the 3' splice region from the target binding domain; and
- d) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA; under conditions in which a portion of the nucleic acid molecule is trans-spliced to a portion of the target pre-mRNA to form a chimeric RNA within the cell.

14. A method of producing a chimeric RNA molecule in a plant cell comprising:

contacting a target pre-mRNA expressed within the cell with a nucleic acid molecule recognized by nuclear splicing components wherein said nucleic acid molecule comprises:

- a) one or more target binding domains that target binding domain of the nucleic acid molecule to a target pre-mRNA expressed within a plant cell;
- b) a 5' splice site;
- c) a spacer region that separates the 5' splice site from the target binding domain; and



d) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA;  
wherein said nucleic acid molecule is recognized by nuclear  
splicing components within the cell.

15. The method of claim 13 wherein the nucleic acid molecule further  
comprises a 5' donor site.

16. The method of claim 13 wherein the nucleic acid molecule further  
comprises a UA rich sequence.

17. The method of claim 13, wherein the chimeric RNA molecule comprises  
sequences encoding a translatable protein.

18. The method of claim 13, wherein the chimeric RNA molecule comprises  
sequences encoding a toxin.

19. A nucleic acid molecule comprising:

- a) one or more target binding domains that target binding domain of  
the nucleic acid molecule to a target pre-mRNA expressed within a  
plant cell;
- b) a 3' splice region comprising a 3' splice acceptor site;



- c) a spacer region that separates the 3' splice region from the target binding domain;
- d) a safety sequence comprising one or more complementary sequences that bind at or adjacent to one or both sides of the 3' splice site; and
- e) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA;

wherein said nucleic acid molecule is recognized by nuclear splicing components within the cell.

20. A nucleic acid molecule comprising :

- a) one or more target binding domains that target binding domain of the nucleic acid molecule to a target pre-mRNA expressed within a plant cell;
- b) a 5' splice site;
- c) a spacer region that separates the 5' splice site from the target binding domain;
- d) a safety sequence comprising one or more complementary sequences that bind at or adjacent to one or both sides of the 5' splice site; and



- e) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA; wherein said nucleic acid molecule is recognized by nuclear splicing components within the cell.

21. The nucleic acid molecule of claim 19 wherein the nucleic acid molecule further comprises a 5' donor site.

22. The nucleic acid molecule of claim 20 further comprising a safety sequence comprising one or more complementary sequences that bind at or adjacent to one or both sides of the 3' splice site.

23. The nucleic acid molecule of claim 19 or 20 wherein the nucleic acid molecule further comprises a UA rich sequence.

24. A eukaryotic expression vector wherein said vector expresses a nucleic acid molecule comprising:

- a) one or more target binding domains that target binding domain of the nucleic acid molecule to a target pre-mRNA expressed within a plant cell;
- b) a 3' splice region comprising a 3' splice acceptor site;
- c) a spacer region that separates the 3' splice region from the target binding domain; and



- d) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA;  
wherein said nucleic acid molecule is recognized by nuclear  
splicing components within the cell.

25. A eukaryotic expression vector wherein said vector expresses a nucleic acid molecule comprising:

- a) one or more target binding domains that target binding domain of the nucleic acid molecule to a target pre-mRNA expressed within a plant cell;
- b) a 5' splice site,
- c) a spacer region that separates the 5' splice site from the target binding domain; and
- d) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA;  
wherein said nucleic acid molecule is recognized by nuclear  
splicing components within the cell.

26. The vector of claim 24 wherein the nucleic acid molecule further comprises a 5' donor site.

27. The vector of claim 24 or 25 wherein the nucleic acid molecule further comprises a UA rich sequence.



28. A nucleic acid molecule comprising:

- a) one or more target binding domains that target binding domain of the nucleic acid molecule to a target pre-mRNA expressed within a cell wherein said target binding domain comprises random nucleotide sequences;
- b) a 5' splice site;
- c) a spacer region that separates the 5' splice site from the target binding domain; and
- d) a nucleotide sequence to be *trans*-spliced to the target pre-mRNA; wherein said nucleic acid molecule is recognized by nuclear splicing components within the cell.